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SPECIES OF THE *ALPINUS* GROUP OF THE GENUS *BAETIS* (EPHEMEROPTERA, BAETIDAE) FROM UKRAINE

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Species of the *Alpinus* Group of the Genus *Baetis* (Ephemeroptera, Baetidae) from Ukraine. Godunko R. J. — Two species from Ukraine belonging to the *alpinus* group of the genus *Baetis* are redescribed. *B. melanonyx* (Pictet) is recorded from Ukraine for the first time (the Bystrytsya Nadvirnyanska and the Tysa river basin). The synonymy of *B. alpinus* (Pictet) and *B. carpathicus* Morton is discussed on the basis of Dziedzielewicz's collection, from the type localities (vicinity of Khomyak Mountain, the Prut river basin). Information on the distribution of the *alpinus* group species in rivers of the Ukrainian Carpathians, data on their ecology and keys to larvae and adult males are provided.
Key words: Ephemeroptera, Baetidae, mayflies, *Baetis*, Ukraine, Carpathians.

Виды группы *alpinus* рода *Baetis* (Ephemeroptera, Baetidae) в фауне Украины. Годунько Р. И. — Для фауны Украины указаны 2 вида рода *Baetis* группы *alpinus*. *B. melanonyx* (Pictet) обнаружен впервые в Украине в бассейнах р. Быстрица Надворнянская и р. Тиса. Рассмотрена проблема синонимии *B. alpinus* (Pictet) и *B. carpathicus* Morton на основе материалов из коллекции Й. Дзедзелевича, собранных в типовых местонахождениях в окр. г. Хомяк (бассейн р. Прут). Представлены сведения по распространению и экологии видов группы в реках Украинских Карпат, а также таблицы для определения личинок и имаго самцов.
Ключевые слова: Ephemeroptera, Baetidae, поденки, *Baetis*, Украина, Карпаты.

Currently 2 species of the *alpinus* group belonging to the genus *Baetis* Leach, 1815 are known to occur in the Carpathian area: *Baetis alpinus* (Pictet, 1843) and *B. melanonyx* (Pictet, 1843). Some additional species of the *alpinus* group were described from the Alps and the Pyrenees. Adult males of these species are characterized by the presence of more or less developed swelling on the medio-apical margin of the forceps base and also by the elongated last segment of the forceps (its length-width minimum ratio=1/2). Larvae have a texture typical for *Baetis* and possess following morphological characters: glossae and paraglossae taped, outer margin of femora with long slender bristles arranged densely, tarsal claws with a pair of fine bristles, terminal filament short, its length not exceeding 1/2 of cerci length (Müller-Liebenau, 1969). Hitherto, only *B. alpinus* was found in Ukraine with indication of its adults and larvae from the Carpathians. Herein, *B. melanonyx* is recorded for the first time from this area and from Ukraine.

Data on these new records and a key to 2 species of the *alpinus* group from the Ukrainian Carpathians are given below.

Baetis alpinus (Pictet, 1843)

Cloe alpina Pictet, 1843; *Baetis amnicus* Eaton, 1871; *B. dorieri* Degrange, 1957; *Baetis carpatica* Morton, 1910.

Material. 3 ♂ adults, Khomyak Mt., Blotek, 18.05.1909; 2 ♂ adults, ibid, 20.05.1909; 2 ♂ adults, ibid, 22.05.1909; ♂ adults, ibid, 7.06.1909 (Dziedzielewicz); 12 larvae, L'viv region, vil. Lybokhora, the Lybokhora riv., 16.06.1996; ♂ adults, 6 larvae, Ivano-Frankivsk region, vil. Vyshkiv, the Mizunka riv., 18.06.1996; 2 ♂ adults, 32 larvae, Ivano-Frankivsk region, Chornogora Range, Breskul Mt., 15–17.07.1997; 8 ♂ adults, ♀ adult, 78 larvae, Ivano-Frankivsk region, the "Gorgany" Reserve, 22–29.07.1997; 12 larvae, ibid, 29.07.1998; 3 ♂ adults, 7 larvae, Zakarpatia region, Sheshul Mt., the Keveliv stream, 15.10.1998 (Godunko).

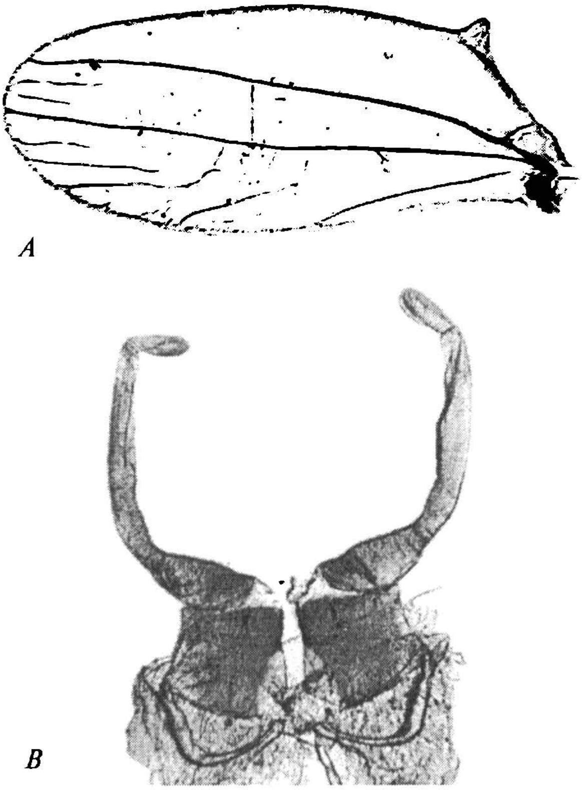


Fig. 1. *Baetis alpinus*, ♂: *A* — hind wing; *B* — forceps.

Рис. 1. *Baetis alpinus*, ♂: *A* — заднее крыло; *B* — форцепсы.

This species was described from Switzerland (Pictet, 1843: 257). *B. amnicus* described by A. E. Eaton (1871) was synonymized with *B. alpinus* (Eaton, 1898: 117). The synonymy of *B. carpathicus* and *B. dorieri* with *B. alpinus* was established by I. Müller-Liebenau (1969). In the work of Dr. Müller-Liebenau certain arguments for supporting the synonymy of the species mentioned actually belong to *B. dorieri*. However, the reasons for identity of *B. alpinus* to *B. carpathicus* in her monograph were left poorly elucidated. When treating Ephemeroptera collection of J. Dziedzielewicz in the Museum of Natural History of the NAS of Ukraine in Lviv, eight male specimens were found to be marked as «*Baлtis carpatica* Mort.». These specimens originated from the type locality were collected simultaneously with the type material. Study of this material confirms that it belongs to *B. alpinus*. Morton (1910) considers no differences from *B. alpinus* in his original description of *B. carpathica*. The hind wing picture given in the work clearly shows numerous intercalary and cross veins (Morton, 1910: fig. 3). The same character of venation was found in adult *B. dorieri* described by C. Degrange (1957: fig. 2). Venation of the hind wing of *B. carpathicus* specimens from Dziedzielewicz's collection shows certain resemblance to the venation described by authors mentioned above (fig. 1, *A*). However, in some part of this material the tendency towards reduction of intercalary and cross veins was observed. Earlier I. Müller-Liebenau pointed out the variability of the hind wing venation in the material from different localities. In a part of *B. alpinus* material collected by the author, the hind wing venation was similar to that in *B. pentaphlebodes* Ujhelyi, 1966 and in some specimens of *B. carpathicus* from Dziedzielewicz's collection. The latter specimens of *B. carpathicus* in the collection of Dziedzielewicz certainly belong to *B. alpinus* by the structure of forceps: the first segment of the forceps is clearly conical, and its apex is half as wide as its base, the second segment is thin at the base and more than twice longer than the first one, the third segment varies in length and is approximately 2.5–3 times as long as wide and is separated from the second one by a well-expressed groove (fig. 1, *B*). The basal segment has a swelling on the inner margin (in the 5 specimens from the collection of Dziedzielewicz this swelling is poorly expressed or almost absent).

Distribution. Adults of *B. alpinus* were described by K. J. Morton from Homiak Mountain (the Prut river-basin) as *B. carpatica*. J. Mikulski cited *B. alpinus* for the whole Carpathians and attributed the species from Chornohora Range to *B. carpathicus* (Mikulski, 1935, 1936). Teliuk (1982) found this species in the lowland rivers of the

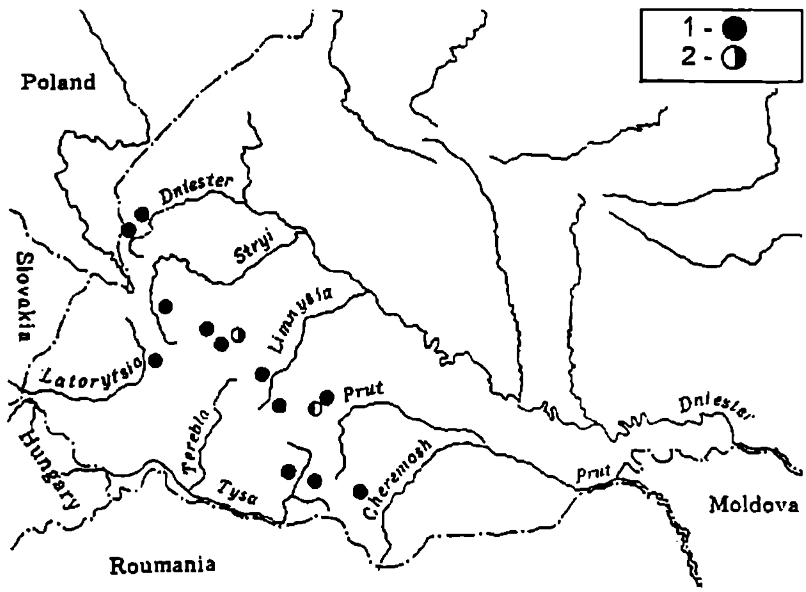


Fig. 2. Distribution of *Baetis alpinus* (*1*) and *B. melanonyx* (*2*) within the Ukrainian Carpathians.
Рис. 2. Распространение *Baetis alpinus* (*1*) и *B. melanonyx* (*2*) на территории Украинских Карпат.

Male Polissia and Roztochia regions. We consider that determination as dubious, because the ecological conditions in rivers examined by Dr. P. M. Teliuk contradict rheophilic specialization of this species. *B. alpinus* typically lives in the mountain, predominantly fast water flows with a rocky bottom. Unfortunately, the materials mentioned by Teliuk are lost and therefore cannot be re-determined. In our study, *B. alpinus* was found in water flows of Beskydy and Gorgany mountain ranges (Godunko, 1997).

Based on comparatively large material, the general pattern of *B. alpinus* distribution can be discussed. The area inhabited by *B. alpinus* is presumed to be restricted to the Ukrainian Ciscarpathians in the North-East. Outside Ukraine the species is distributed from France to Poland (the Alps and the Carpathians), inhabits northern Italy and the Balkan Peninsula (Landa, 1969).

Ecology. In the Ukrainian Carpathians *B. alpinus* predominates in rapid water flows with rocky bottom and cold water rich in oxygen at the altitude of 400 to 1800 m. The lowest locality was found in the upper basin of Dniester, and the highest — on the Chornogora Range, where larvae of *B. alpinus* were found in small "alpine" streams. This species comprises the dominant component of amphibiotic entomofauna and is a single representative of the order *Ephemeroptera* in hydrocoenoses of such a kind. Larvae inhabit water flows with the summer temperature range of 8–12°C. The period of the flight of adults is prolonged. In the Ukrainian Carpathians the species has two generations per year; nymphs and adults of the second generation were found in high mountains of the Chornohora Range (slopes of Sheshul Mountain ~ 1600 m) in the middle of October.

Baetis melanonyx (Pictet, 1843)

Cloe melanonyx Pictet, 1843; *Baetis kulindrophtalmus* Bogoescu, 1933; *Baetis principii* Grandi, 1949; *B. bengtssoni* Müller-Liebenau, 1966.

Material. 10 larvae, Ivano-Frankivsk region, the "Gorgany" Reserve, "Ozirnyi" locality, the Dovzhynets stream, 29.07.1997; 4 larvae, Zakarpatia region, vil. Kvasy, the Tysa riv., 15.10.1998 (Godunko).

In the whole area of the Carpathians *B. melanonyx* was recorded from Romania by Bogoescu (1933), who described it under the name *B. kulindrophtalmus* (Plashti region in the Transilvanian Alps). From the Polish Carpathians the species was recorded by Keller (1960) as *B. carpathica*, by Kownacka (1971) as *B. kulindrophtalmus*, by Sowa (1975) and Kłonowska-Olejnik (1997) as *B. melanonyx*; from Slovakia the species was recorded several times by Deván (1995) and Krno (1997); from Eastern and Northern Bohemia (Czech Republic) the species was cited by Soldán (1978).

Larvae of this species were found in a tributary of the Bystrytsa Nadvirnjanska river (1000 m) and in the Tysa river (550 m) (first record for Ukraine) together with larvae of *B. alpinus*.

Some nymphs of *B. melanonyx* were found in the streamline and in littoral parts of water flow on the rocky substrate. Summer temperature in the examined water flows was 8–10°C.

The localities of *B. alpinus* and *B. melanonyx* in the Ukrainian Carpathians are shown on the figure 2.

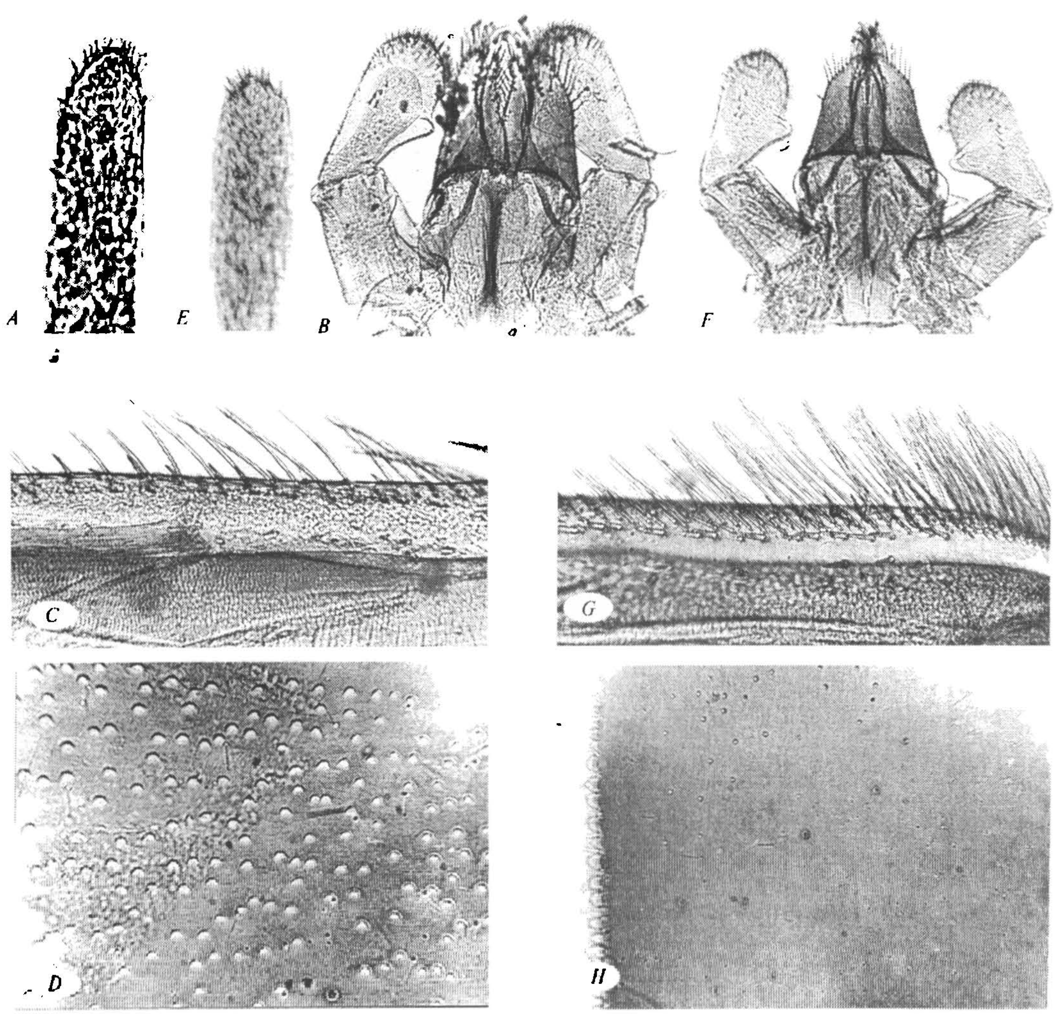


Fig. 3. The peculiarities of larvae textures in *Baetis melanonyx* (*A—D*) and *B. alpinus* (*E—H*): *A, E* — maxillary palp; *B, F* — labium; *C, G* — outer margin of femur; *D, H* — surface of abdominal tergite.

Рис. 3. Особенности строения *Baetis melanonyx* (*A—D*) и *B. alpinus* (*E—H*): *A, E* — максилярный щупик; *B, F* — лябиум; *C, G* — внешний край бедра; *D, H* — поверхность брюшного тергита.

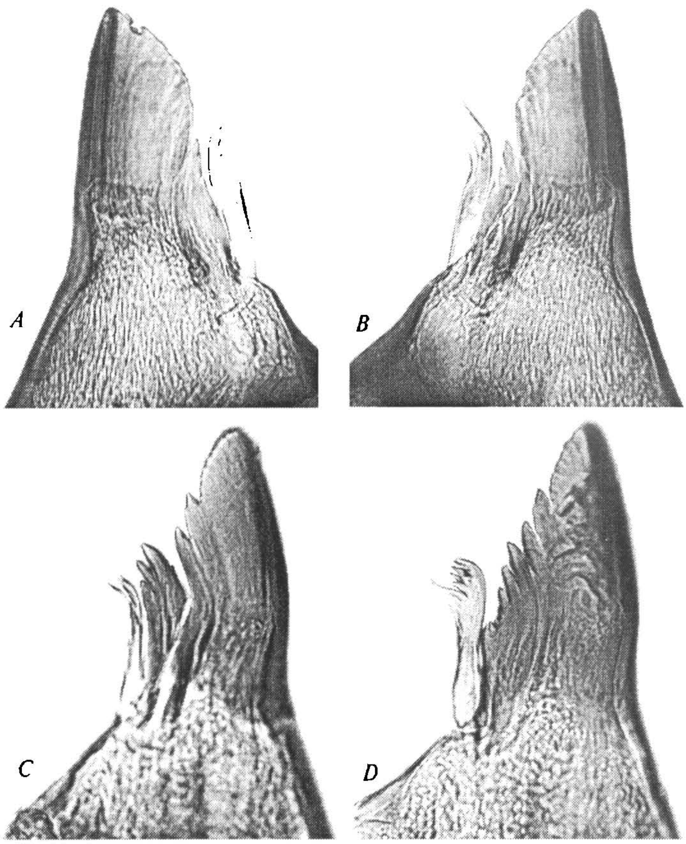


Fig. 4. *Baetis melanonyx* (*A*, *B*) and *B. alpinus* (*C*, *D*): *A*, *C* — right mandibles; *B*, *D* — left mandibles.
Рис. 4. *Baetis melanonyx* (*A*, *B*) и *B. alpinus* (*C*, *D*): *A*, *C* — правые мандибулы; *B*, *D* — левые мандибулы.

The representatives of the *alpinus* group can be distinguished by following key:

Key to species of the *alpinus* group of the genus *Baetis* inhabiting Central Europe

Ключ для определения видов группы *alpinus* рода *Baetis* Центральной Европы

Larvae

1 (4). Only one stout spine at the apex of maxillary palps (fig. 3, *A*).
2 (3). Outer group of teeth on the mandible fused together into a long single tooth (fig. 4, *A*, *B*). Glossae and paraglossae slightly thickened and closely drawn nearer at the apex (fig. 3, *B*). Outer margin of femur with scanty diffused bristles (fig. 3, *C*). Surface of abdominal tergites mainly with bristle bases (fig. 3, *D*). Terminal filament does not exceed 1/2 of cerci length .... *B. melanonyx* (Pictet, 1843)
3 (2). Teeth of the outer group on the mandible arranged into two essentially different structures .... other species of *Baetis* s. str.
4 (1). 2–14 distinct stout spines at the apex of maxillary palps.
5 (6). 2–5 spines at the apex of maxillary palps. Surface of abdominal tergites without scales and any traces of bristle bases .... *B. nubecularis* Eaton, 1898
6 (5). 5–14 spines at the apex of maxillary palps (fig. 3, *E*). Teeth of outer group on the mandible longer than inner ones and rather wide, teeth of inner group developed normally (fig. 4, *C*, *D*). Glossae and paraglossae thin and elongated towards the apex (fig. 3, *F*). Outer margin of the femur with numerous long and slender bristles (fig. 3, *G*). Surface of abdominal tergites with numerous scales (fig. 3, *H*). The terminal filament rudimentary or half of cerci length .... *B. alpinus* (Pictet, 1843)

Adult males

1 (4). Distal part of forceps base with more or less marked swelling on the inner margin.
2 (3). First segment of forceps slightly wider in its base than at apex. Second segment less than twice as long as the first one .... *B. nubecularis* Eaton, 1898

3 (2). First segment of forceps clearly conical, twice wider at its base than at its apex. Second segment more than twice as long as the first one. Third segment 2.5–3 times as long as wide .... *B. alpinus* (Pictet, 1843)

4 (1). Distal part of the forceps base clearly rounded on the inner margin. First segment of forceps feebly conical, decreasing slightly in diameter from base to apex and elongated in its distal part. Second segment twice as long as first one. Third segment 2–3 times as long as wide .... *B. melanonyx* (Pictet, 1843)

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